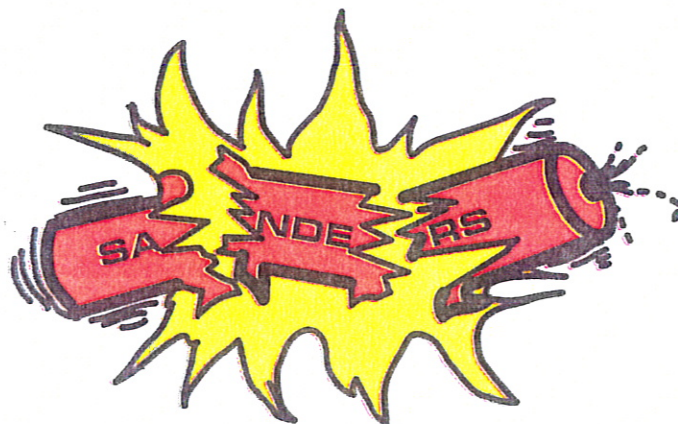


WESTERN STATES DRILLING AND BLASTING, INC.

**MATERIAL SAFETY DATA SHEETS
(MSDS)**



Initiating Systems

Chemical List

Sanders Construction, Inc.
Western States Drilling and Blasting

Initiating Systems

Connectadets (Connectors)	Orica
Cordtex (Det-Cord)	Orica
Handidets (Blasting Caps)	Orica
Lead-in-Line (Shocktube)	Orica
EZ-Dets/EZTL (Blasting Caps/Connectors)	Dyno
Lead-in-Line (Shocktube)	Dyno
Prima Cord (Det-Cord)	Dyno

Packaged Explosives

Magnum Ultra (Stick Powder)	Orica
Magnafrac (Stick Powder)	Orica
Magnum Powersplit (Pre-Split)	Orica
Pentex Boosters (Cast Boosters)	Orica
Ammonium Nitrate Fuel Oil (Bagged ANFO)	Orica
Apex Extra (Non-Cap Sensitive Stick Powder)	Orica
Apex Plus (Non-Cap Sensitive Stick Powder)	Orica
Apex Ultra (Non-Cap Sensitive Stick Powder)	Orica
Powerditch 1000/Geldyne (Stick Powder)	Orica
Cord Sensitive Boosters (Cast Boosters)	Dyno
Dyno AP (Stick Powder)	Dyno
Dynosplit C (Pre-Split)	Dyno
ANFO (Bagged ANFO)	Dyno

Electronic Blasting Systems

Unitronic (Electronic Blasting Caps)	Orica
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Material Safety Data Sheet

Preparation Date: 19-Jul-2007

Revision Date: 22-Oct-2008

Revision Number: 1

SECTION 1 – PRODUCT AND COMPANY INFORMATION

Supplier(s):

Orica Canada Inc.
Maple Street
Brownsburg, QC

For MSDS Requests: 1-450-533-4201

Orica USA Inc

33101 E Quincy Ave
Watkins, CO 80137-9406

For MSDS Requests: 1-303-268-5000

Product Name:

Exel™ Connectadet™ (Detonator Assemblies Non-Electric)

Product Code:

20063

Alternate Name(s):

Not Available

UN-No:

UN0500

Recommended Use:

Non-Electric detonators and accessory products.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL: ORICA CANADA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636. IN US CALL: CHEMTREC 1-800-424-9300. IN THE U.S. FOR LOST, STOLEN OR MISPLACED EXPLOSIVES CALL: BATF 1-800-800-3855. FORM ATF F5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 – HAZARD IDENTIFICATION

Emergency Overview:

The following information is the potential hazards associated with the ingredient(s) in this product. It is our belief that, under conditions of normal occupational exposure, this product should pose no such hazards to the user. Main risk is that of explosion by shock, friction, fire or other sources of ignition. Read the entire MSDS for a more thorough evaluation of the hazards.

Appearance:

A signal line (solid core/shock/tube) containing an explosive charge and a detonator.

Physical State:

Solid

Odor:

None

SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS

Chemical Name

Pentaerythritol Tetranitrate (PETN)

Lead Azide

Cyclotetramethylenetetranitramine (HMX)

Aluminum

CAS-No

78-11-5

13424-46-9

2691-41-0

7429-90-5

Weight %

0-10

0-5

0.2 – 0.4

<0.1

Also- may contain a lead sheathed delay element(s); may include a delay composition.

SECTION 4- FIRST AID MEASURES

General Advice:

General: Not applicable; this is a packaged product that will not result in exposure to the contents under normal conditions of use.

In the event of contact, administer first aid appropriate for burns, laceration and bruises. If detonation fumes are inhaled, remove to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation, but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.

Eye Contact:

No applicable information.

Skin Contact:

No applicable information.

Inhalation:

In the event those workers are overexposed to fumes and vapour resulting from detonation, remove victim from exposure and provide artificial respiration if not breathing.

Ingestion:

No applicable information.

Notes to Physician: No applicable information.

SECTION 5 – FIRE-FIGHTING MEASURES

Flammable properties: High explosive with mass detonation hazard. Expected to be sensitive to mechanical impact. Not expected to be sensitive to static discharge.

Suitable extinguishing media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Evacuate surrounding areas. When controlling fire before involvement of explosives, fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate. Water may be used on small fires.

Unsuitable extinguishing media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. This product is a high explosive with a mass detonation hazard. Thermal decomposition can lead to release of irritating gases and vapors.

Protective equipment and precautions for fire fighters: As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Methods for containment: No information available.

Methods for cleaning up: Not required. If detonators are damaged, contact an Orica Canada Inc. or Orica USA Inc. technical representative. Deactivating Chemicals: Not required. If detonators are broken, contact product advisor.

SECTION 7 - HANDLING AND STORAGE

Handling: This product is an explosive and should only be used under the supervision of trained personnel. Protect containers from physical damage. Keep away from incompatible materials, heat, sparks, flames and other ignition sources. Avoid rough handling.

Storage: Store under moderate temperatures recommended by a technical services representative. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, sparks and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Keep away from incompatibles. Meet all legal requirements for shipping and magazing.

Storage Temperature: It is recommended that detonators not be stored or used at temperatures exceeding 70 °C (158 °F) without approved procedures to address the elevated temperatures.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Other exposure guidelines: Recommendations listed in this section indicate the type of equipment that will provide protection against exposure to this product under normal conditions of use. Conditions of use, adequacy of engineering or other control measures, and actual exposure situations will dictate the need for specific protective devices at your workplace.

Engineering Measures: Full-handling precautions should be taken at all times.

Personal Protective Equipment

Eye/Face Protection: Safety glasses with side-shields are recommended to prevent eye contact.

Skin Protection: Gloves and protective clothing made from cotton should provide adequate protective.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	A signal line (solid core/shock/tube) Containing an explosive charge and A detonator.	Odor:	None
Physical State:	Solid	Viscosity:	No Information Available
		Melting Point/Range:	PETN melts at 140 °C / 284 °F

pH: No data available
Flammable Limits (upper): No data available
Explosion Power: No data available
Vapor Pressure: Not available
Partition Coefficient (n-octanol/water): No data available

Flammable Limits (lower): No data available
Specific Gravity: Not available
Oxidizing Properties: No information available

SECTION 10 - STABILITY AND REACTIVITY

Stability: Can explode from impact, heat or friction. If detonators are broken, contact product advisor. PETN explodes at 190 - 210 °C (374 - 410 °F).
Conditions to avoid: Impact or shock. Static discharge.
Incompatible materials: Acids. Bases.
Hazardous decomposition products: Thermal decomposition products are toxic and may include lead, hydrocarbons, oxides of carbon and nitrogen. To a lesser degree, decomposition products may include oxides of lead, chromium, barium, boron and hydrogen cyanide.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity

Subchronic Toxicity (23 days): Organic nitrates act as vasodilators; signs and symptoms of poisoning include headache, dizziness, increased heart rate, postural weakness and hypotension. Dermatitis or "drug rash" of the skin may also be observed.

Chronic toxicity: Contains no substance that is a known carcinogen.
Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by NTP (National Toxicology Program).

Reproductive effects: It is our belief that under normal conditions of use, this product should pose no reproductive hazard to the worker. Lead exposure may cause reproductive effects based on studies in laboratory animals and on human epidemiological studies.
Developmental effects: It is our belief that under normal conditions of use, this product should pose no reproductive hazard to the worker. Lead has been shown to cause congenital abnormalities and behavioral deficits in experimental animals in addition to its ability to increase the number of miscarriages, stillbirths and abortions in lead-exposed women.
Target Organ: Eyes, Skin, Cardiovascular system, Immune system.
Other adverse effects: Prolonged or repeated exposure to organic nitrates may develop a tolerance due to chronic dilation of the blood vessels. This tolerance disappears rapidly after a few days away from exposure and withdrawal symptoms consisting of angina and heart attack have been reported in chronically exposed workers. Another type of tolerance loss is the "Monday morning disease", where workers experience headaches, dizziness, postural weakness and other symptoms.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity effects: Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Method: Burn under supervision of an expert at a government-approved explosive burning ground or destroy, by detonation in boreholes, in accordance with applicable local, provincial and federal laws. Call upon the services of an Orica Canada Inc. or Orica USA Inc. technical representative.

SECTION 14 - TRANSPORT INFORMATION

DOT Proper Shipping Name:	Detonator assemblies, Non-Electric
Hazard Class:	1.4S (depending on packaging)
UN-No:	UN0500
Packing Group:	II
TDG Proper Shipping Name:	Detonator assemblies, Non-Electric
Hazard Class:	1.4S (depending on packaging)
UN-No:	UN0500
Packing Group:	II

SECTION 15 - REGULATORY INFORMATION

CANADIAN CLASSIFICATION: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR.

WHMIS hazard class: This product is an explosive and is not regulated by WHMIS.

USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements,

SARA 311/312 Hazardous Categorization

Acute Health Hazard:	No
Chronic Health Hazard:	No
Fire Hazard:	No
Reactive Hazard:	Yes
Sudden Release of Pressure Hazard:	No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

Other Regulations/Legislations which apply to this product: Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Right-to-Know, Rhode Island Right-to-Know.

TSCA: Complies

DSL: Complies

NDSL: Complies

SECTION 16 - OTHER INFORMATION

Prepared By: Safety, Health & Environment
303-263-5000

Preparation Date: 19-Jul-2007
Revision Date: 22-Oct-2008

The information contained herein is offered as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

End of MSDS



Material Safety Data Sheet

Preparation Date: 21-May-2005

Revision Date: 22-Oct-2008

Revision Number: 1

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Supplier(s):

Orica Canada Inc.
Maple Street
Brownsburg, QC

For MSDS Requests: 1-450-533-4201

Orica USA Inc.

33101 E. Quincy Avenue
Watkins, CO 80137-9406

For MSDS Requests: 1 303-268-5000

Product Name:

B-line™, Boostercord™, Cordtex™, Powercord™, Primaflex™

Product Code:

40040

Alternate Name(s):

Uniline, B-Line, Trunkline, Powercord 100, Powercord 150, Powercord 200, Powercord O 200, Boostercord, Primaflex, Anoline, X-245, X-247, Cordtex 7.5, Cordtex SHD, Cordtex 15, Cordtex LT, Cordtex AP, Cordtex 18, Cordtex 25, Cordtex Premium, Cordtex 40, Cordtex TL, Cordtex 50, Cordtex XTL, Cordtex 60, T-line, Special, 4400 M/S, Poly, Low Flash 25

UN-No:

UN0065

Recommended Use:

Used for initiation of explosive mixtures.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL: THE ORICA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636. IN THE U.S. CALL: CHEMTREC 1-800-424-9300. IN THE U.S.: FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF 1-800-800-3855. FORM ATF F 5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 – HAZARD IDENTIFICATION

Emergency Overview:

Danger. Explosive. Risk of explosion by shock, friction, fire or other sources of ignition. This product is an article. No exposure to hazardous chemicals is expected to occur during intended product use. Misuse of the product may result in exposure to hazardous chemicals.

Appearance:

Cords covered with PVC or polyethylene plastic and/ or wax textiles

Physical State:

Solid

Odor:

Odorless

SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS

Chemical Name

Pentaerythritol Tetranitrate (PETN)

CAS-No

115-77-5

Weight %

60-100

SECTION 4 – FIRST AID MEASURES

General Advice:

Not applicable; this is a packaged product that will not result in exposure to the contents under normal conditions of use. In the event of contact, administer first aid appropriate for symptoms present.

Eye Contact:

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediate medical attention is required.

Skin Contact:

Wash off immediately with soap and plenty of water, removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Inhalation:

Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is not breathing AND no pulse. Obtain medical advice IMMEDIATELY.

Ingestion:

Immediate medical attention is required. Do not induce vomiting. Clean mouth with water and afterwards drink plenty of water. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Never give anything by mouth to and unconscious person.

Notes to physician:

Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

SECTION 5 – FIRE-FIGHTING MEASURES

Flammable properties:	Product burns if ignited, with possible transition to detonation. May ignite or explode if heated under confinement.
Suitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Evacuate surrounding areas. When controlling fire before involvement of explosives, fire-fighters should wear positive pressure self-containing breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate.
Unsuitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Attempts to smother a fire involving this product will be ineffective as it is its own oxygen source. Smother this product could lead to decomposition and explosion. This product is more sensitive to detonation if contaminated with organic or oxidisable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible.
Specific hazards arising from the chemical:	This product is a high explosive with mass detonation hazard. DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors.
Protective equipment and precautions for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Methods for containment:	No information available.
Methods for cleaning up:	Review fire and explosion hazards before proceeding with clean up. Remove and protect ignition sources. Wear protective equipment during clean up. Mop up water using non-sparking tools. It is suggested that only personnel trained in Emergency Response should respond. Verify complete account of product(s). Notify authorities and follow applicable spill reporting requirements.

SECTION 7 – HANDLING AND STORAGE

Handling:	This product is an explosive and should only be used under the supervision of trained personnel. Protect containers from physical damage. Keep away from incompatible materials, heat, sparks, flames and other ignition sources. Avoid rough handling.
Storage:	Store under moderate temperatures recommended by a technical services representative. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, sparks and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Keep away from incompatibles.

SECTION 8 – EXPOSURE CONTROLS/ PERSONAL PROTECTION

Engineering Measures:	Full-handling precautions should be taken at all times.
Personal Protective Equipment	
Eye/Face Protection:	Tightly fitting safety goggles
Skin Protection:	Long sleeved clothing.
Respiratory Protection:	No special protective equipment required.
Hygiene Measures:	Handle in accordance with good industrial hygiene and safety practice.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Cords covered with PVC or polyethylene plastic and/or wax and textiles	Odor:	None
Physical State:	Solid	Viscosity:	No information available
pH:	No data available	Flash Point:	Not applicable
Autoignition Temperature:	No data available	Boiling Point/Range:	Not applicable
Melting Point/Range:	No data available	Flammable Limits (Upper):	Not applicable
Flammable Limits (Lower):	Not applicable	Explosion Power:	No data available
Specific Gravity:	No data available	Water Solubility:	Negligible
Other Solubility:	Not applicable	Vapor Pressure:	No data available
Oxidizing Properties:	Not available	Partition Coefficient (n-octanol/water):	No data available

SECTION 10 – STABILITY AND REACTIVITY

Stability:	Can explode from impact, heat or friction. PETN explodes at 190 - 210°C (374 - 410°F). Stable up to approximately 70°C.
Conditions to avoid:	Keep away from heat, impact, and friction. Some cords have limited tensile strength and abrasion resistance. Refer to the Product Bulletin for proper applications and use procedures. Damaged cords can lead to misfired holes - potentially, the most hazardous of all blasting situations. Avoid abrasion of cord on hole collars or casing pipes.
Incompatible materials:	Strong oxidizing agents. The PVC/polyethylene plastic or wax covering will, in time, be affected by diesel oil.
Hazardous decomposition products:	Carbon oxide. Nitrogen oxides (NOx). Hydrocarbons.

SECTION 11 – TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information:	Irritating to eyes. May cause skin irritation. Harmful if swallowed.
Chronic Toxicity:	Not available.
Carcinogenicity:	The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by TNTP (National Toxicology Program).
Mutagenic effects:	There is no evidence of mutagenic potential.
Irritation:	Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons.
Reproductive effects:	No information is available and no adverse reproductive effects are anticipated.
Developmental effects:	No information is available and no adverse developmental effects are anticipated.
Target Organ:	Eyes, skin, respiratory system, blood, liver, urinary tract, gastrointestinal tract (GI), endocrine system, & immune system.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity effects:	There is no known ecological information for this product.
Persistence/Degradability:	Not applicable.
Mobility in Environmental media:	Not applicable.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Method:	Burn under supervision of an expert at an explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an Orica Technical Representative.
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SECTION 14 – TRANSPORT INFORMATION

DOT Proper Shipping Name: Cord, Detonating
Hazard Class: 1.1D
UN-No: UN0065
Packing group: II
TDG Proper Shipping Name: Cord, Detonating
Hazard Class: 1.5D
UN-No: UN0065
Packing group: II

SECTION 15 – REGULATORY INFORMATION

CANADIAN CLASSIFICATION: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

WHMIS hazard class: This product is an explosive and is not regulated by WHMIS.

USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements,

SARA 311/312 Hazardous Categorization

Acute Health Hazard: No
Chronic Health Hazard: No
Fire Hazard: No
Reactive Hazard: Yes
Sudden Release of Pressure Hazard: No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents
Other Regulations/Legislations which apply to this product: No information available.

TSCA: Complies

DSL: Complies

NDSL: Complies

SECTION 16 – OTHER INFORMATION

Prepared by: Safety Health & Environment
303-268-5000

Preparation Date: 21-May-2005
Revision Date: 22-Oct-2008

REFERENCES:

RTECS-Registry of Toxic Effects of Chemical Substances, CCINFODisc, Canadian Centre for Occupational Health and Safety, National Institute for Occupational Safety and Health, U.S. Dept. of Health & Human Services, Cincinnati, 1998.

Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA, B, C, John Wiley and Sons, New York, 1981.

Supplier's Material Safety Data Sheets.

CHEMINFO, HSDB, & NIOSH through "CCINFODisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, 1998.

"CHEMINFO", "CHRIS", "TOG", "DOT", through "CCINFODisc", Occupational Health and Safety, Hamilton, Ontario, Canada.

Documentation of the Threshold Limit Values and Biological Exposure Indices, 5th ed., American Conference of Governmental Industrial Hygienists Inc., Cincinnati, 1986.

Threshold Limit Values and Biological Exposure Indices for 1997, American Conference of Governmental Industrial Hygienists, Cincinnati, 1997.

Windholz, Martha, Ed., The Merck Index, 11 th ed., Merck and Co., Inc., Rahway, New Jersey, 1989

The information contained herein is offered only as guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

End of MSDS

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Cords covered with PVC or polyethylene plastic and/or wax and textiles	Odor:	None
Physical State:	Solid	Viscosity:	No information available
pH:	No data available	Flash Point:	Not applicable
Autoignition Temperature:	No data available	Boiling Point/Range:	Not applicable
Melting Point/Range:	No data available	Flammable Limits (Upper):	Not applicable
Flammable Limits (Lower):	Not applicable	Explosion Power:	No data available
Specific Gravity:	No data available	Water Solubility:	Negligible
Other Solubility:	Not applicable	Vapor Pressure:	No data available
Oxidizing Properties:	Not available	Partition Coefficient (n-octanol/water):	No data available

SECTION 10 – STABILITY AND REACTIVITY

Stability:	Can explode from impact, heat or friction. PETN explodes at 190 - 210°C (374 - 410°F). Stable up to approximately 70°C.
Conditions to avoid:	Keep away from heat, impact, and friction. Some cords have limited tensile strength and abrasion resistance. Refer to the Product Bulletin for proper applications and use procedures. Damaged cords can lead to misfired holes - potentially, the most hazardous of all blasting situations. Avoid abrasion of cord on hole collars or casing pipes.
Incompatible materials:	Strong oxidizing agents. The PVC/polyethylene plastic or wax covering will, in time, be affected by diesel oil.
Hazardous decomposition products:	Carbon oxide. Nitrogen oxides (NOx). Hydrocarbons.

SECTION 11 – TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information:	Irritating to eyes. May cause skin irritation. Harmful if swallowed.
Chronic Toxicity:	Not available.
Carcinogenicity:	The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by TINTP (National Toxicology Program).
Mutagenic effects:	There is no evidence of mutagenic potential.
Irritation:	Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons.
Reproductive effects:	No information is available and no adverse reproductive effects are anticipated.
Developmental effects:	No information is available and no adverse developmental effects are anticipated.
Target Organ:	Eyes, skin, respiratory system, blood, liver, urinary tract, gastrointestinal tract (GI), endocrine system, & immune system.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity effects:	There is no known ecological information for this product.
Persistence/Degradability:	Not applicable.
Mobility in Environmental media:	Not applicable.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Method:	Burn under supervision of an expert at an explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an Orica Technical Representative.
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SECTION 14 – TRANSPORT INFORMATION

DOT Proper Shipping Name: Cord, Detonating
Hazard Class: 1.1D
UN-No: UN0065
Packing group: II
TDG Proper Shipping Name: Cord, Detonating
Hazard Class: 1.5D
UN-No: UN0065
Packing group: II

SECTION 15 – REGULATORY INFORMATION

CANADIAN CLASSIFICATION: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

WHMIS hazard class: This product is an explosive and is not regulated by WHMIS.

USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements,

SARA 311/312 Hazardous Categorization

Acute Health Hazard: No
Chronic Health Hazard: No
Fire Hazard: No
Reactive Hazard: Yes
Sudden Release of Pressure Hazard: No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

Other Regulations/Legislations which apply to this product: No information available.

TSCA: Complies

DSL: Complies

NDSL: Complies

SECTION 16 – OTHER INFORMATION

Prepared by: Safety Health & Environment
303-263-5000

Preparation Date: 21-May-2005
Revision Date: 22-Oct-2008

REFERENCES:

RTECS-Registry of Toxic Effects of Chemical Substances, CCINFODisc, Canadian Centre for Occupational Health and Safety, National Institute for Occupational Safety and Health, U.S. Dept. of Health & Human Services, Cincinnati, 1998.

Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA, B, C, John Wiley and Sons, New York, 1981.

Supplier's Material Safety Data Sheets.

CHEMINFO, HSDB, & NIOSH through "CCINFODisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, 1998.

"CHEMINFO", "CHRIS", "TOG", "DOT", through "CCINFODisc", Occupational Health and Safety, Hamilton, Ontario, Canada.

Documentation of the Threshold Limit Values and Biological Exposure Indices, 5th ed., American Conference of Governmental Industrial Hygienists Inc., Cincinnati, 1986.

Threshold Limit Values and Biological Exposure Indices for 1997, American Conference of Governmental Industrial Hygienists, Cincinnati, 1997.

Windholz, Martha, Ed., The Merck Index, 11 th ed., Merck and Co., Inc., Rahway, New Jersey, 1989

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End of MSDS



Material Safety Data Sheet

Preparation Date: 19-Jul-2007

Revision Date: 22-Oct-2008

Revision Number: 1

SECTION 1 – PRODUCT AND COMPANY INFORMATION

Supplier(s):

Orica Canada Inc.

Maple Street

Brownsburg, QC

For MSDS Requests: 1-450-533-4201

Orica USA Inc

33101 E Quincy Ave

Watkins, CO 80137-9406

For MSDS Requests: 1-303-268-5000

Product Name:

Exel™ Detonator Assemblies Non-Electric

Product Code:

20080

Alternate Name(s):

Exel™ Constadet™, Exel™ Handidet™, Exel™ Handidet™ LP, Exel™ XE MS, Exel™ LP (W), Exel™ MS (W), Exel™ XT, & Exel™ T&D

UN-No:

UN0360 or UN 0361 (Depending on packaging)

Recommended Use:

Non-Electric detonators and accessory products.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL: ORICA CANADA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636. IN US CALL: CHEMTREC 1-800-424-9300. IN THE U.S. FOR LOST, STOLEN OR MISPLACED EXPLOSIVES CALL: BATF 1-800-800-3855. FORM ATF F5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 – HAZARD IDENTIFICATION

Emergency Overview:

The following information is the potential hazards associated with the ingredient(s) in this product. It is our belief that, under conditions of normal occupational exposure, this product should pose no such hazards to the user. Main risk is that of explosion by shock, friction, fire or other sources of ignition. Read the entire MSDS for a more thorough evaluation of the hazards.

Appearance:

A signal line (solid core/shock/tube) containing an explosive charge and a detonator.

Physical State:

Solid

Odor:

None

SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS

Chemical Name

CAS-No

Weight %

Pentaerythritol Tetranitrate (PETN)

78-11-5

0-10

Lead Azide

13424-46-9

0-5

Cyclotetramethylenetetranitramine (HMX)

2691-41-0

0.2 – 0.4

Aluminum

7429-90-5

<0.1

Also- may contain a lead sheathed delay element(s); may include a delay composition.

SECTION 4- FIRST AID MEASURES

General Advice:

General: Not applicable; this is a packaged product that will not result in exposure to the contents under normal conditions of use.

In the event of contact, administer first aid appropriate for burns, laceration and bruises. If detonation fumes are inhaled, remove to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation, but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.

Eye Contact:

No applicable information.

Skin Contact:

No applicable information.

Inhalation:

In the event those workers are overexposed to fumes and vapour resulting from detonation, remove victim from exposure and provide artificial respiration if not breathing.

Ingestion:

No applicable information.

Notes to Physician:

No applicable information.

20080- Exel™ Detonator Assemblies Non-Electric

SECTION 5 – FIRE-FIGHTING MEASURES

Flammable properties:	High explosive with mass detonation hazard. Expected to be sensitive to mechanical impact. Not expected to be sensitive to static discharge.
Suitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Evacuate surrounding areas. When controlling fire before involvement of explosives, fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate. Water may be used on small fires.
Unsuitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. This product is a high explosive with a mass detonation hazard. Thermal decomposition can lead to release of irritating gases and vapors.
Protective equipment and precautions for fire fighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Methods for containment:	No information available.
Methods for cleaning up:	Not required. If detonators are damaged, contact an Orica Canada Inc. or Orica USA Inc. technical representative. Deactivating Chemicals: Not required. If detonators are broken, contact product advisor.

SECTION 7 - HANDLING AND STORAGE

Handling:	This product is an explosive and should only be used under the supervision of trained personnel. Protect containers from physical damage. Keep away from incompatible materials, heat, sparks, flames and other ignition sources. Avoid rough handling.
Storage:	Store under moderate temperatures recommended by a technical services representative. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, sparks and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Keep away from incompatibles. Meet all legal requirements for shipping and magazing.
Storage Temperature:	It is recommended that detonators not be stored or used at temperatures exceeding 70 °C (158 °F) without approved procedures to address the elevated temperatures.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Other exposure guidelines:	Recommendations listed in this section indicate the type of equipment that will provide protection against exposure to this product under normal conditions of use. Conditions of use, adequacy of engineering or other control measures, and actual exposure situations will dictate the need for specific protective devices at your workplace.
Engineering Measures:	Full-handling precautions should be taken at all times.
Personal Protective Equipment	
Eye/Face Protection:	Safety glasses with side-shields are recommended to prevent eye contact.
Skin Protection:	Gloves and protective clothing made from cotton should provide adequate protective.
Hygiene Measures:	Handle in accordance with good industrial hygiene and safety practice.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	A signal line (solid core/shock/tube) Containing an explosive charge and A detonator.	Odor:	None
Physical State:	Solid.	Viscosity:	No Information Available
pH:	No data available	Melting Point/Range:	PETN melts at 140 °C / 284 °F
Flammable Limits (upper):	No data available	Flammable Limits (lower):	No data available

Explosion Power: No data available
Vapor Pressure: Not available
Partition Coefficient (n-octanol/water): No data available

Specific Gravity: Not available
Oxidizing Properties: No information available

SECTION 10 - STABILITY AND REACTIVITY

Stability: Can explode from impact, heat or friction. If detonators are broken, contact product advisor. PETN explodes at 190 - 210°C (374 - 410°F).
Conditions to avoid: Impact or shock. Static discharge.
Incompatible materials: Acids. Bases.
Hazardous decomposition products: Thermal decomposition products are toxic and may include lead, hydrocarbons, oxides of carbon and nitrogen. To a lesser degree, decomposition products may include oxides of lead, chromium, barium, boron and hydrogen cyanide.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity

Subchronic Toxicity (23 days): Organic nitrates act as vasodilators; signs and symptoms of poisoning include headache, dizziness, increased heart rate, postural weakness and hypotension. Dermatitis or "drug rash" of the skin may also be observed.

Chronic toxicity: Contains no substance that is a known carcinogen.
Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by NTP (National Toxicology Program).

Reproductive effects: It is our belief that under normal conditions of use, this product should pose no reproductive hazard to the worker. Lead exposure may cause reproductive effects based on studies in laboratory animals and on human epidemiological studies.

Developmental effects: It is our belief that under normal conditions of use, this product should pose no reproductive hazard to the worker. Lead has been shown to cause congenital abnormalities and behavioral deficits in experimental animals in addition to its ability to increase the number of miscarriages, stillbirths and abortions in lead-exposed women.

Target Organ: Eyes, Skin, cardiovascular system, Immune system.

Other adverse effects: Prolonged or repeated exposure to organic nitrates may develop a tolerance due to chronic dilation of the blood vessels. This tolerance disappears rapidly after a few days away from exposure and withdrawal symptoms consisting of angina and heart attack have been reported in chronically exposed workers. Another type of tolerance loss is the "Monday morning disease", where workers experience headaches, dizziness, postural weakness and other symptoms.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity effects: Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Method: Burn under supervision of an expert at a government-approved explosive burning ground or destroy, by detonation in boreholes, in accordance with applicable local, provincial and federal laws. Call upon the services of an Orica Canada Inc. or Orica USA Inc. technical representative.

SECTION 14 - TRANSPORT INFORMATION

DOT Proper Shipping Name:	Detonator assemblies, Non-Electric
Hazard Class:	1.1B or 1.4B (depending on packaging)
UN-No:	UN0360 or UN0361 (depending on packaging)
Packing Group:	II
TDG Proper Shipping Name:	Detonator assemblies, Non-Electric
Hazard Class:	1.1B or 1.4B (depending on packaging)
UN-No:	UN0360 or UN0361 (depending on packaging)
Packing Group:	II

SECTION 15 - REGULATORY INFORMATION

CANADIAN CLASSIFICATION: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

WHMIS hazard class: This product is an explosive and is not regulated by WHMIS.

USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements,

SARA 311/312 Hazardous Categorization

Acute Health Hazard:	No
Chronic Health Hazard:	No
Fire Hazard:	No
Reactive Hazard:	Yes
Sudden Release of Pressure Hazard:	No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

Other Regulations/Legislations which apply to this product: Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Right-to-Know, Rhode Island Right-to-Know.

TSCA: Complies

DSL: Complies

NDSL: Complies

SECTION 16 - OTHER INFORMATION

Prepared By: Safety, Health & Environment
303-268-5000

Preparation Date: 19-Jul-2007
Revision Date: 22-Oct-2008

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End of MSDS



Material Safety Data Sheet

Preparation Date: 19-Jul-2007

Revision Date: 22-Oct-2008

Revision Number: 1

SECTION 1 – PRODUCT AND COMPANY INFORMATION

Supplier(s):

Orica Canada Inc.

Maple Street

Brownsville, QC

For MSDS Requests: 1-450-533-4201

Orica USA Inc

33101 E Quincy Ave

Watkins, CO 80137-9406

For MSDS Requests: 1-303-268-5000

Product Name:

Exel™ Lead-In-Line™, Exel™ Shock Tube™ (Bulk)

Product Code:

20015

Alternate Name(s):

Bulk Shock Tubing

UN-No:

UN0349

Recommended Use:

Shock Tube for non-electric blast initiation.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL: ORICA CANADA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636. IN US CALL: CHEMTREC 1-800-424-9300. IN THE U.S. FOR LOST, STOLEN OR MISPLACED EXPLOSIVES CALL: BATF 1-800-800-3855. FORM ATF F5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 – HAZARD IDENTIFICATION

Emergency Overview:

This product is an article. No exposure to hazardous chemicals is expected to occur during intended product use. Misuse of the product may result in exposure to hazardous chemicals. The following information is the potential hazards associated with the ingredient(s) in this product. It is our belief that, under conditions of normal occupational exposure, this product should pose no such hazards to the user. Main risk is that of explosion by shock, friction, fire or other sources of ignition. Read the entire MSDS for a more thorough evaluation of the hazards.

Appearance:

Polyolefin tube with unspecified color

Physical State:

Solid

Odor:

None

SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS

Chemical Name

Cyclotetramethylenetetranitramine (HMX) /

Octogen

Aluminum

CAS-No

2691-41-0

7429-90-5

Weight %

0.2 – 0.4

<0.1

SECTION 4- FIRST AID MEASURES

General Advice:

General: Not applicable; this is a packaged product that will not result in exposure to the contents under normal conditions of use.

In the event of contact, administer first aid appropriate for burns, laceration and bruises. If detonation fumes are inhaled, remove to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation, but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.

Eye Contact:

No applicable information.

Skin Contact:

No applicable information.

Inhalation:

In the event those workers are overexposed to fumes and vapour resulting from detonation, remove victim from exposure and provide artificial respiration if not breathing.

Ingestion:

No applicable information.

Notes to Physician:

No applicable information.

SECTION 5 – FIRE-FIGHTING MEASURES

Flammable properties:	High explosive with mass detonation hazard. Expected to be sensitive to mechanical impact. Not expected to be sensitive to static discharge.
Suitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Evacuate surrounding areas. When controlling fire before involvement of explosives, fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate. Water may be used on small fires.
Unsuitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVES.
Specific hazards arising from the Chemical:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. This product is a high explosive with a mass detonation hazard. Thermal decomposition can lead to release of irritating gases and vapors.
Protective equipment and precautions for fire fighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Methods for containment:	No information available.
Methods for cleaning up:	Not required. Contact an Orica Canada Inc. or Orica USA Inc. Technical Representative.

SECTION 7 - HANDLING AND STORAGE

Handling:	This product is an explosive and should only be used under the supervision of trained personnel. Protect containers from physical damage. Keep away from incompatible materials, heat, sparks, flames and other ignition sources. Avoid rough handling.
Storage:	Keep container tightly closed in a dry and well-ventilated place.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures:	Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction.
Personal Protective Equipment	
Eye/Face Protection:	Tightly fitting safety goggles.
Skin Protection:	not required for normal use.
Respiratory protection:	Use a NIOSH-approved respirator, if required.
Hygiene Measures:	Handle in accordance with good industrial hygiene and safety practice.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Polyolefin tube with unspecified color.	Odor:	None
Physical State:	Solid	Viscosity:	No Information Available
pH:	No data available	Melting Point/Range:	PETN melts at 140 °C / 284 °F
Flammable Limits (upper):	No data available	Flammable Limits (lower):	No data available
Explosion Power:	No data available	Specific Gravity:	Not available
Water Solubility:	Negligible	Other Solubility:	No information available
Vapor Pressure:	Not available	Oxidizing Properties:	No information available
Partition Coefficient (n-octanol/water):	No data available		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Conditions to avoid:	Keep away from heat, sparks, flame, impact and friction.
Incompatible materials:	None.
Hazardous decomposition products:	Thermal decomposition products are toxic and may include hydrocarbons, oxides of carbon and nitrogen.
Hazardous polymerization:	Hazardous polymerization does not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information:	This product has not been tested for toxicity. Information provided is based on the components.
Carcinogenicity:	There are no known carcinogenic chemicals in this product.
Mutagenicity:	There is no evidence of mutagenic potential.
Sensitization:	None.
Reproductive effects:	None.
Developmental effects:	None.
Target Organ:	No information available.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity effects:	Contains no substances known to be hazardous to the environment or not degradable in wastewater treatment plants.
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SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Method:	Burn under supervision of an expert at an explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an Orica Technical Representative.
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SECTION 14 - TRANSPORT INFORMATION

DOT Proper Shipping Name:	Articles, Explosive, N.O.S.
Hazard Class:	1.4S or Unclassified
UN-No:	UN0349
Packing Group:	II
TDG Proper Shipping Name:	Articles, Explosive, N.O.S.
Hazard Class:	1.4S or Unclassified
UN-No:	UN0349
Packing Group:	II

SECTION 15 - REGULATORY INFORMATION

CANADIAN CLASSIFICATION:	This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR
WHMIS hazard class:	This product is an explosive and is not regulated by WHMIS.
USA CLASSIFICATION:	
SARA Regulations Sections 313 and 40 CFR 372:	No reportable components present
SARA 311/312 Hazardous Categorization	
Acute Health Hazard:	No
Chronic Health Hazard:	No
Fire Hazard:	No
Reactive Hazard:	Yes
Sudden Release of Pressure Hazard:	No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents
Other Regulations/Legislations which apply to this product: Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Special Health Hazard Substance List

TSCA: Complies

DSL: Complies

NDSL: Complies

SECTION 16 - OTHER INFORMATION

Prepared By: Safety, Health & Environment
303-268-5000

Preparation Date: 19-May-2005
Revision Date: 22-Oct-2008

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End of MSDS

Material Safety Data Sheet

Dyno Nobel Inc.
2650 Decker Lake Boulevard, Suite 300
Salt Lake City, Utah 84119
Phone: 801-364-4800 Fax: 801-321-6703
E-Mail: dnnn.hse@am.dynonobel.com
FOR 24 HOUR EMERGENCY, CALL CHEMTREC (USA) 800-424-9300
CANUTEC (CANADA) 613-996-6666

MSDS # 1122
Date 01/22/09

Supersedes
MSDS # 1122 08/13/08

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): NONEL® MS
NONEL® MS ARCTIC
NONEL® LP
NONEL® SL
NONEL® TD
NONEL® MS CONNECTOR
NONEL® TWINPLEX™
NONEL® STARTER
NONEL® EZ DET®
NONEL® EZTL™
NONEL® EZ DRIFTER®

Product Class: NONEL® Non-electric Delay Detonators

Product Appearance & Odor: Aluminum cylindrical shell with varying length and diameter of attached colored plastic tubing. The detonator may be enclosed in a plastic housing, and an assembly may contain two detonators. Odorless.

DOT Hazard Shipping Description: UN0029 Detonators, non-electric 1.1B II
-or- UN0360 Detonator assemblies, non-electric 1.1B II
-or- UN0361 Detonator assemblies, non-electric 1.4B II

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS#	Occupational Exposure Limits	
		OSHA PEL-TWA	ACGIH TLV-TWA
Pentaerythritol Tetranitrate (PETN)	78-11-5	None ¹	None ²
Lead Azide	13424-46-9	0.05 mg (Pb)/m ³	0.05 mg (Pb)/m ³
Lead	7439-92-1	0.05 mg (Pb)/m ³	0.05 mg (Pb)/m ³
Silicon	7440-21-3	15 mg / m ³ (total dust) 5 mg / m ³ (respirable fraction)	10 mg / m ³
Selenium	7782-49-2	0.2 mg/m ³	0.2 mg/m ³
Red Lead (Lead tetroxide)	1314-41-6	0.05 mg (Pb)/m ³	0.05 mg (Pb)/m ³
Titanium dioxide	13463-67-7	15 mg/m ³	10 mg/m ³
Barium Chromate	10294-40-3	1 mg (CrO ₃)/10m ³ (ceiling)	0.01 mg (Cr)/m ³
Lead Chromate	7758-97-6	0.5 mg (Ba)/m ³ 0.05 mg (Pb)/m ³ 1 mg (CrO ₃)/10m ³ (ceiling)	0.5 mg (Ba)/m ³ 0.15 mg (Pb)/m ³ 0.012 mg (Cr)/m ³
Barium Sulfate	7727-43-7	0.5 mg (Ba)/m ³	10 mg/m ³
Potassium Perchlorate ³	7778-74-7	None ¹	None ²
Silica (crystalline)	61790-53-2	See Note Below	0.05 mg/m ³ (resp frac)

Material Safety Data Sheet

Molybdenum	7439-98-7	None ¹	None ²
Tungsten	7440-33-7	None ¹	5 mg/m ³ (TWA) 10 mg/m ³ (STEL)
Aluminum	7429-90-5	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)	5 mg/m ³
Antimony	7440-36-0	0.5 mg/m ³	0.5 mg/m ³
Cyclotetramethylene Tetranitramine (HMX)	2691-41-0	None ¹	None ²

¹ Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m³; respirable fraction, 5 mg/m³.

² Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m³; respirable part., 3 mg/m³.

Note: The OSHA PEL for crystalline silica is calculated as follows:

Quartz, respirable: 10 mg/m³ / % SiO₂ + 2 Quartz, total dust: 30 mg/m³ / % SiO₂ + 2

³ Not all delay periods contain perchlorate. Those that do contain between from about 4 to a maximum of about 60 mg perchlorate per detonator.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Percent Volatile by Volume: Not Applicable
Evaporation Rate (Butyl Acetate = 1): Not Applicable

Vapor Pressure: Not Applicable
Density: Not Applicable
Solubility in Water: Not Applicable

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Extinguishing Media: (See Special Fire Fighting Procedures section.)

Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe, distant location. Allow fire to burn unless it can be fought remotely or with fixed extinguishing systems (sprinklers).

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

This is a packaged product that will not result in exposure to the explosive material under normal conditions of use. Exposure concerns are primarily with post-detonation reaction products, particularly heavy metal compounds.

Eyes: No exposure to chemical hazards anticipated with normal handling procedures. Particulates in the eye may cause irritation, redness, swelling, itching, pain and tearing.

Skin: No exposure to chemical hazards anticipated with normal handling procedures. Exposure to post-detonation reaction products may cause irritation.

Ingestion: No exposure to chemical hazards anticipated with normal handling procedures. Post-detonation reaction product residue is toxic by ingestion. Symptoms may include gastroenteritis with abdominal pain, nausea, vomiting and diarrhea. See systemic effects below.

Material Safety Data Sheet

Inhalation: Not a likely route of exposure. See systemic effects below.

Systemic or Other Effects: None anticipated with normal handling procedures. Repeated inhalation or ingestion of post-detonation reaction products may lead to systemic effects such as respiratory tract irritation, ringing of the ears, dizziness, elevated blood pressure, blurred vision and tremors. Heavy metal (lead) poisoning can occur.

Carcinogenicity: ACGIH classifies Lead as a "Suspected Human Carcinogen" and insoluble Chromium VI as "Confirmed Human Carcinogen". NTP, OSHA, and IARC consider components contained in this detonator carcinogenic.

Perchlorate: Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone. The National Academy of Sciences (NAS) has reviewed the toxicity of perchlorate and has concluded that even the most sensitive populations could ingest up to 0.7 microgram perchlorate per kilogram of body weight per day without adversely affecting health. The USEPA must establish a maximum contaminant level (MCL) for perchlorate in drinking water by 2007, and this study by NAS may result in a recommendation of about 20 ppb for the MCL.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

Skin: Wash with soap and water.

Ingestion: Seek medical attention.

Inhalation: Not applicable.

Special Considerations: None

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact.

Conditions to Avoid: Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock. Do not attempt to disassemble.

Materials to Avoid (Incompatibility): Corrosives (acids and bases or alkalis).

Hazardous Decomposition Products: Carbon Monoxide (CO), Nitrous Oxides (NO_x), Sulfides, Chromates, Lead (Pb), Antimony (Sb) and various oxides and complex oxides of metals.

Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate all personnel to a safe distant area and allow to burn or fight fire remotely. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repack product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. If loose explosive powder is spilled, such as from a broken detonator, only properly qualified and authorized personnel should be involved with handling and clean-up activities. Spilled explosive powder is extremely sensitive to initiation and may detonate. Follow applicable Federal, State, and local spill reporting requirements.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

Material Safety Data Sheet

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: None required for normal handling. Provide enhanced ventilation after use if in underground mines or other enclosed areas.

Respiratory Protection: None required for normal handling.

Protective Clothing: Cotton gloves are recommended.

Eye Protection: Safety glasses are recommended.

Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Only properly qualified and authorized personnel should handle and use explosives. Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock.

Precautions to be taken during use: Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death. Avoid breathing the fumes or gases from detonation of explosives. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

Material Safety Data Sheet

SECTION X - SPECIAL INFORMATION

These products contain the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Chemical Name	CAS Number	Max. lbs/1000 units
Lead	7439-92-1 (Use Toxic Chemical Category Code)	39.4
Lead Compounds	N420	2.0
Barium Compounds	N040	1.8
Chromium Compounds	N090	1.9

Range* of Section 313 Chemicals in each product

Product	lb Pb per 1000 detonators	lb Pb compounds per 1000 detonators	lb Ba compounds per 1000 detonators	lb Cr compounds per 1000 detonators
NONEL [®] MS	0 - 27	0.3 - 1.5	0 - 0.9	0 - 0.9
NONEL [®] LP	0 - 30	0.3 - 2.0	0 - 1.8	0 - 1.9
NONEL [®] SL	7 - 27	0.3 - 1.5	0	0
NONEL [®] TD	0 - 18	0.3 - 0.7	0	0
NONEL [®] MS Connector	5 - 16	0.3 - 0.4	0	0
NONEL [®] TWINPLEX [™]	5 - 15	0.3 - 0.7	0	0
NONEL [®] STARTER	0	0.3	0	0
NONEL [®] EZ DET [®]	22 - 36	2.0	0	0
NONEL [®] EZTL [™]	5 - 15	0.5 - 0.7	0	0
NONEL [®] EZ DRIFTER	39.4	1.3	1.2	1.3

* The exact quantity and weight percent of Section 313 Chemicals in each delay period and tubing length for each product is available upon request.

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Material Safety Data Sheet

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MSDS # 1124
Date 08/13/08

Supersedes
MSDS # 1124 01/24/05

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): NONEL® LEAD LINE

Product Class: Shock Tube

Product Appearance & Odor: Hollow plastic tubing (normally yellow) with dusty inner coating of HMX and aluminum. No detectable odor.

DOT Hazard Shipping Description: UN0349 Articles, explosive, n.o.s. (HMX) 1.4S II.
For 10,000 ft spools with Wire Lock Terminations only: Not regulated as an explosive, 0000

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	% (Range)	Occupational Exposure Limits	
			OSHA PEL-TWA	ACGIH TLV-TWA
Cyclotetramethylene	2691-41-0	0.35	None ¹	None ²
Tetranitramine (HMX)				
Aluminum (dust)	7429-90-5	0.04	15 mg/m ³ (total) 5 mg/m ³ (respirable)	10 mg/m ³

¹ Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m³; respirable fraction, 5 mg/m³.

² Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m³; respirable part., 3 mg/m³.

Note: The above hazardous dust mixture is present at approximately 15 mg per meter of tubing.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Melting Point: HMX decomposes violently at melting pt., about 278°C
Evaporation Rate (Butyl Acetate = 1): Not Applicable

Vapor Pressure: Not Applicable
Density: Not Applicable
Solubility in Water: Not Soluble
Percent Volatile by Volume: Not Applicable

Material Safety Data Sheet

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Extinguishing Media: Water, inert powder, CO₂

Special Fire Fighting Procedures: For shock tube only, consider initial isolation of at least 15 meters (50 feet) in all directions. Fight fire with normal precautions and methods used for plastic fires from a reasonable distance. IF DETONATORS OR OTHER EXPLOSIVES ARE PRESENT, DO NOT FIGHT FIRE.

Unusual Fire and Explosion Hazards: May burn vigorously with localized detonations and projection of fragments, with effects usually confined to the immediate vicinity of packages. Toxic smoke from combustion of the plastic material may be emitted. If product functions, high heat and pressure are released from the end of the tube if not covered or enclosed, typically by a metal device.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

This is a packaged product that will not result in exposure to hazardous ingredients (inner coating materials) under normal conditions of use.

Eyes: Not a likely route of exposure. Dust particles may be irritating.

Skin: Not a likely route of exposure. Dust particles may cause skin irritation.

Ingestion: Not a likely route of exposure. Ingestion of large amounts of the reactive powder (HMX) is poisonous and may cause cardiovascular collapse.

Inhalation: Not a likely route of exposure. Breathing dust can cause respiratory irritation. During manufacture and at processing temperatures, irritating fumes may evolve.

Systemic or Other Effects: None known.

Carcinogenicity: No constituents are listed by NTP, IARC or OSHA.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

Skin: Wash with soap and water.

Ingestion: Not Applicable

Inhalation: Not Applicable

Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Keep away from heat, flame, impact, friction, ignition sources and strong shocks. Also avoid stretching to failure.

Materials to Avoid (Incompatibility): Incompatible with strong oxidizers and acids.

Hazardous Decomposition or Combustion Products: Hazardous carbon monoxide (CO), nitrogen oxide (NO_x) gases and products of plastic decomposition produced.

Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 50 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, repackage undamaged devices in original packaging, accounting for every device. If the ends or tube wall have been opened such that powder may have

Material Safety Data Sheet

been released from the tube, isolate the spill area. Contamination of the HMX/Aluminum powder with sand, grit or dirt will render the material more sensitive to detonation. Carefully wet down and clean "loose" powder spills using a damp sponge or rag, avoid applying friction or pressure to the explosive, and place in a (Velostat) electrically conductive bag. Follow applicable Federal, State, and local spill reporting requirements.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: None normally required. Provide enhanced ventilation if used in underground mines, indoors or other enclosed areas.

Respiratory Protection: None normally required. Extended testing of the product indoors or in enclosed areas may necessitate respiratory protection.

Protective Clothing: None normally required. Wear chemical-resistant gloves during post-detonation cleanup or spill cleanup operations.

Eye Protection: Safety glasses or goggles are recommended for handling, testing or cleanup.

Other Precautions Required: None

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources and strong shock. Only properly qualified and authorized personnel should handle and use Shock Tube.

Precautions to be taken during use: Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death. Avoid breathing the fumes or gases from detonation of explosives. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

<u>Chemical Name</u>	<u>CAS Number</u>	<u>% By Weight</u>
None		

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MSDS # 1126
Date 01/24/05

Supersedes
MSDS # 1126 10/20/03

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): PRIMALINE®
PRIMACORD®
PRIMASHEAR™
OPTICORD®
GEOSEIS®
LOW FLEX™
FIRELINE CORD

Product Class: Detonating Cord

Product Appearance & Odor: Flexible cord of woven textile with a protected explosive core of PETN (white crystalline powder) and covered by a white or colored plastic or textile jacket. May have a waxed finish. No odor.

DOT Hazard Shipping Description: Cord, Detonating 1.1D UN0065 II

FPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS#	%	Occupational Exposure Limits	
			OSHA PEL-TWA	ACGIH TLV-TWA
Pentaerythritol tetranitrate (PETN)	78-11-5	-----*	None ¹	None ²

¹ Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m³; respirable fraction, 5 mg/m³.

² Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m³; respirable part., 3 mg/m³.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

* Core powder is 100% PETN. The approximate amount of PETN in a given grade of cord is expressed as that number of grams of PETN per linear meter of cord. Range is from 1 to 280 gram/meter. Example: PRIMALINE® 5 contains approximately 5 grams PETN per meter of cord. (1 gram/meter = 4.7 grains/foot)

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable (PETN decomposes at melting point, about 141°C)

Vapor Pressure: Not Applicable

Percent Volatile by Volume: Not Applicable

Vapor Density: (Air = 1) Not Applicable

Solubility in Water: Insoluble.

Material Safety Data Sheet

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Extinguishing Media: (See Special Fire Fighting Procedures section.)

Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe, distant location. Allow fire to burn unless it can be fought remotely or with fixed extinguishing systems (sprinklers). For transportation fires involving large quantities of detonating cord, such as a trailer load, evacuate no less than 2,500 feet in all directions.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning or detonating material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

This is a packaged product that will not result in exposure to the explosive core material under normal conditions of use.

Eyes: May cause irritation, redness and tearing.

Skin: PETN is not known as a skin irritant or sensitizer.

Ingestion: PETN is moderately toxic if ingested. See systemic effects below.

Inhalation: See systemic effects below.

Systemic or Other Effects: PETN is a known coronary vasodilator, and ingestion or inhalation may result in a lowering of blood pressure, headache or faintness, and a decreased tolerance for grain alcohol. Repeated over-exposure may result in chest pains in the absence of exposure. Systemic effects by ingestion include dermatitis.

Carcinogenicity: No constituents are listed by NTP, IARC or OSHA.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

Skin: Wash with soap and water.

Ingestion: Seek medical attention.

Inhalation: Remove to fresh air. If symptoms persist, seek medical attention.

Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

Conditions to Avoid: Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock.

Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).

Hazardous Decomposition Products: Nitrogen Oxides (NO_x), Carbon Monoxide (CO)

Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate all personnel to a safe distant area and allow to burn or fight fire remotely. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If explosive powder is spilled from damaged detonating cord, remove all other explosives from the spill area. Wet down and clean spilled powder using a damp sponge or rag, avoid applying friction or pressure to the explosive, and place in a (Velostat) electrically conductive bag. Contamination of this material with sand, grit or dirt will render the material more sensitive to detonation. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other